CLAIMS

What is Claimed:

1. A method for manufacturing an electrode catalyst layer comprising the steps of :

ejecting droplets of a first electrode ink composition from a nozzle of an inkjet device onto a base material, the first electrode ink composition containing at least one electrode active material in a solvent matrix;

ejecting droplets of a second electrode ink composition from a nozzle of an ink jet device onto a base material, the second electrode ink composition containing at least one binder material in a solvent matrix.

2. The method of claim 1 wherein the first electrode ink composition further contains at least one electroconductive material.

3. The manufacturing method of Claim 1 wherein the base material is at least one of a collector or an electrolyte film.

4. The manufacturing method of Claim 1 wherein the first electrode ink composition further contains at least one surfactant material.

5. The manufacturing method of claim 4 wherein the surfactant material is at least one of a carboxylic acid system surfactant and an ether-type nonionic surfactant,

6. The manufacturing method of claim 5 wherein the ether-type nonionic surfactant is polyoxyethylene ether type nonionic surfactant.

7. The manufacturing method of claim 4 wherein the surfactant material has an HLB value between 5 and 30.

8. The manufacturing method of claim 4 wherein the surfactant material is present in the first electrode ink composition in an amount sufficient to provide 0.05-10 wt% in a resulting coating layer with respect to total quantity of the electrode active material in the resulting layer.

9. The manufacturing method of claim 4 wherein the first electrode ink composition is employed to prepare a positive electrode and wherein the electrode active material in the first electrode ink composition is at least one of a Li-Mn oxide compound or a Li-Ni oxide compound.

10. The manufacturing method of claim 4 wherein the first electrode ink composition is employed to prepare a negative electrode and wherein the electrode active material is at least one of a crystalline carbon material and a non-crystalline carbon material.

11. An electrode comprising:

a base material having at least one surface;

a catalyst layer overlying at least a portion of the surface of the base material,

wherein the catalyst is prepared by a process including the steps of:

ejecting droplets of a first electrode ink composition from a nozzle of an inkjet device onto a base material, the first ink composition containing at least one electrode active material alone or in combination with at least one electroconductive material in a solvent matrix;

ejecting droplets of a second electrode ink composition from a nozzle of an ink jet device onto a base material, the second ink composition containing at least one binder material in a solvent matrix.

12. A battery comprising at least one positive electrode, at least one electrolyte layer, and at least one negative electrode sequentially positioned in laminated relationship to one another, wherein at least one of the positive electrode or the negative electrode are prepared by a process including the steps of:

ejecting droplets of a first electrode ink composition from a nozzle of an inkjet device onto a base material, the first electrode ink composition containing at least one electrode active material alone or in combination with at least one electroconductive material in a solvent matrix;

ejecting droplets of a second electrode ink composition from a nozzle of an ink jet device onto a base material, the second electrode ink composition containing at least one binder material in a solvent matrix.

13. A battery stack comprising at least one battery having at least one electrode prepared by a process including the steps of:

ejecting droplets of a first electrode ink composition from a nozzle defined in an inkjet device onto a base material, the first electrode ink composition containing at least one electrode active material alone or in combination with at least one electroconductive material in a solvent matrix;

ejecting droplets of a second electrode ink composition from a nozzle defined in an ink jet device onto a base material, the second electrode ink composition containing at least one binder material in a solvent matrix.

14. A vehicle comprising a power source wherein the power source includes at least one battery comprising at least one positive electrode, at least one electrolyte layer, and at least one negative electrode sequentially positioned in laminated relationship to one another, at least one of the positive electrode or the negative electrode are prepared by a process including the steps of:

ejecting droplets of a first electrode ink composition from a nozzle defined in an

inkjet device onto a base material, the first electrode ink composition containing at least one electrode active material alone or in combination with at least one electroconductive material in a solvent matrix;

ejecting droplets of a second electrode ink composition from a nozzle defined in an ink jet device onto a base material, the second electrode ink composition containing at least one binder material in a solvent matrix.

15. An electrode ink composition comprising:

at least one particulate electrode active material;

at least one surfactant compound; and

a solvent.

16. The electrode ink composition of claim 15 wherein the particulate electrode active material has an average grain size between 0.01 μm and 1.0 μm.

17. The electrode ink composition of claim 15 wherein the electrode ink composition has a total solids content between 5 wt% and 30wt% based on total electrode ink composition.

18. The electrode ink composition of claim 15 wherein the surfactant compound is present in an amount between 0.1 wt% and 5.0 wt% based on total electrode ink composition.